
ढलाई में प्रयुक्त क्रोमाइट रेत — विशिष्टि
(पहला पुनरीक्षण)

**Chromite Sand for Use in
Foundries — Specification**
(*First Revision*)

ICS 77.180

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Foundry Steel Casting Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1973. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards. In addition, the following changes have been made:

- a) Reference clause has been included;
- b) In **5**, IS 12667 (Part 1 to Part 4) are referred for chemical analysis;
- c) In **10**, IS 460 (Part 1 and Part 3) are referred for test sieves; and
- d) Clause **13** and **14** have been modified and updated.

Chromite sand is used either as a moulding sand or as a core sand in the production of castings.

This standard contains **5.1** and **5.2** which call for an agreement between the purchaser and the supplier.

The composition of the Committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CHROMITE SAND FOR USE IN FOUNDRIES — SPECIFICATION

(First Revision)

1 SCOPE

This standard covers the requirements of chromite sand for use in foundries.

2 REFERENCES

The standards listed in Annex A contain provisions, which through references in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 SUPPLY OF MATERIAL

General requirements relating to the supply of chromite sand for use in foundries shall be as laid down in IS 1387.

4 GRADES

The material shall be of two grades, namely:

- a) Fine; and
- b) Coarse.

The size ranges for the above mentioned two grades are given in Table 2.

5 CHEMICAL COMPOSITION

5.1 Chromite sand shall have the following chemical composition on dry mass basis, as given in Table 1:

Table 1 Chemical Composition

(Clause 5.1)

Sl No.	Constituent	Requirement
		percent
(1)	(2)	(3)
i)	Cr ₂ O ₃	44 %, <i>Min</i>
ii)	Fe ₂ O ₃	26 %, <i>Max</i>
iii)	SiO ₂	4 %, <i>Max</i>
iv)	CaO	0.5 %, <i>Max</i>
v)	Loss on ignition	1 %, <i>Max</i>

If required, maximum limit for magnesium oxide (MgO) content may also be specified as agreed to between the purchaser and the supplier.

5.2 The chemical composition of the material shall be determined either by the methods specified in IS 12667 (Part 1 to Part 4) or any other established instrumental/chemical method. In case of dispute, the procedure given in the latest version of above mentioned Indian Standard shall be the referee method. However, where the method is not given in IS 12667 (Part 1 to Part 4), the referred method shall be agreed to between the purchaser and the manufacturer.

6 pH VALUE

The pH value of the sand, when determined in accordance with the method specified in Annex B, shall be between 7.0 and 9.0.

7 ACID DEMAND VALUE

The acid demand value, when determined in accordance with the method given in Annex B, shall conform to the following requirements:

Sl No.	pH	Acid Demand Value, <i>Max</i>
(1)	(2)	(3)
i)	3	10 ml
ii)	4	8 ml
iii)	5	6 ml

8 FUSION POINT

When tested in accordance with IS 1918, the fusion temperature of chromite sand shall be more than 1 800 °C.

9 GRAIN SHAPE

When tested in accordance with IS 1918, the washed sand grain shall be mostly sub-angular in shape.

10 GRAIN FINENESS

The fineness of the two grades of chromite sand shall conform to Table 2.

Table 2 Sieve Analysis

(Clauses 4 and 10)

Sl No.	IS Sieve Designation (Micron)	Fraction Retained on	
		Fine Grade (F) Percent	Coarse Grade (C) Percent
(1)	(2)	(3)	(4)
i)	710	—	5, <i>Max</i>
ii)	500	—	10, <i>Max</i>
iii)	355	—	10 to 25
iv)	250	3, <i>Max</i>	10 to 25
v)	212	18, <i>Max</i>	10 to 20
vi)	150	70, <i>Min</i>	10 to 20
vii)	106		7 to 20
viii)	75		12, <i>Max</i>
ix)	Pan	12, <i>Max</i>	6, <i>Max</i>

10.2 The test sieves used shall be in accordance with sizes specified in IS 460 (Part 1) and IS 460 (Part 2). As the standard test sieve will become less accurate after period of time, the sieve shall therefore be periodically checked according to IS 460 (Part 3) and the correction factor shall be determined and applied to the result.

NOTE — In case IS Sieves is not available, equivalent BS or ASTM Sieves specified in Annex C may be used. The BS and ASTM sieves listed in Annex C have their apertures within the limits specified for the corresponding IS Sieves.

11 CLAY CONTENT

The clay content when determined in accordance with IS 1918 shall not exceed 0.75 percent.

12 SAMPLING

12.1 Representative samples shall be drawn according to the scheme of sampling given in IS 1811.

12.2 Moisture Content

When tested in accordance with the method given in IS 1918 shall not be more than 0.5 percent.

13 PACKING

Chromite sand shall be packed and supplied in bags each containing 50 kg, in any of the following bags:

- a) Jute sacking bags;

- b) Multi-wall paper sacks conforming to IS 11761;

- d) HDPE/PP woven sacks conforming to IS 11652;

- e) Jute synthetic union bags conforming to IS 12174; and

- f) Any other approved composite bag.

Bags shall be in good condition at the time of inspection.

14 MARKING

14.1 The bags containing chromite sand shall be clearly marked with the following:

- a) Grade of the material;
- b) Batch No.;
- c) Manufacturer's name; and
- d) Trade-mark.

14.2 BIS Certification Marking

The products (s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standard Act, 2016* and the Rules and Regulations framed there under, and the product may be marked with the Standard Mark.

ANNEX A

(Clause 2)

LIST OF REFFERED STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 460	Test sieves — Specifications:		sacks for packaging of 50 kg cement — Specification
(Part 1) : 2020	Wire cloth test sieve (<i>fourth revision</i>)		(<i>third revision</i>)
(Part 3) : 2020	Methods of examination of apertures of test sieves (<i>fourth revision</i>)	IS 11761 : 1997	Multi — Wall paper sacks for cement — Specification (<i>first revision</i>)
IS 1070 : 2023	Reagent grade water — Specification (<i>fourth revision</i>)	IS 12174 : 1987	Specification for jute synthetic union bags for packing cement
IS 1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)	IS 12667	Chromite sand for foundries — Methods of chemical analysis:
IS 1811 : 1984	Methods of sampling foundry sand (<i>first revision</i>)	(Part 1) : 1989	Determination of silica
IS 1918 : 1966	Methods of physical tests for foundry sands	(Part 2) : 1989	Determination of iron
IS 11652 : 2017	Textiles — High density polyethylene (HDPE)/polypropylene (PP) woven	(Part 3) : 1989	Determination of chromium
		(Part 4) : 1989	Determination of calcium

ANNEX B

(Clauses 6 and 7)

TEST METHODS

A-1 QUALITY OF REAGENTS

A-1.1 Unless otherwise specified, pure chemicals and distilled water (*see* IS 1070) shall be used in the tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-1.2 Reagents

A-1.2.1 *Hydrochloric Acid* — 0.1 N

A-1.2.2 *Sodium Hydroxide Solution* — 0.1 N

A-2 DETERMINATION OF pH VALUE

A-2.1 Preparation of the Sample

Take about 50 g of chromite sand in 100 ml of distilled water and stir together for at least 5 min.

A-2.2 Test Temperature

The test shall be carried out at $27\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

A-2.3 Procedure

Measure the pH of the supernatant liquid at short intervals, with repeated stirring by any standard pH meter using glass electrodes, until constant.

NOTE — The pH is determined at room temperature preferably by electrometric methods.

A-3 DETERMINATION OF ACID DEMAND VALUE

A-3.1 Test Temperature

The test shall be carried out at $27\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

A-3.2 Procedure

Stir together for at least 5 min, 50 g of chromite sand, 50 ml of distilled water and 50 ml of 0.1 N hydrochloric acid. Allow to stand for a minimum period of 1 h and back-titrate the resulting solution with 0.1 N sodium hydroxide solution to pH 3, pH 4 and pH 5. The amount of acid consumed at each pH level gives the acid demand value of the sand.

ANNEX C

[Clause 10.2 (NOTE)]

COMPARATIVE SIEVE DESIGNATIONS OF IS, BS AND ASTM TEST SIEVES

<i>Sl No.</i>	<i>IS Sieve</i> (Micron)	<i>BS Sieve</i>	<i>ASTM Sieve</i>
(1)	(2)	(3)	(4)
i)	710	22	707
ii)	500	30	500
iii)	355	44	354
iv)	250	60	250
v)	212	72	210
vi)	150	100	149
vii)	106	150	105
viii)	75	200	74

ANNEX D*(Foreword)***COMMITTEE COMPOSITION**

Foundry and Steel Castings Sectional Committee, MTD 14

<i>Organization</i>	<i>Representative(s)</i>
BHEL (CFFP), Haridwar	SHRI V. K. RAIZADA (Chairperson)
Bharat Heavy Electricals Ltd, HPEP, Hyderabad	SHRI ABHINAV AGRAWAL
BHEL, Haridwar	SHRI A. N. SUDHAKAR SHRI RANJITH LAKRA (<i>Alternate</i>)
Bhilai Engineering Corporation Limited, Bhilai	SHRI AKHIL DUBEY SHRI SHIV DUTT MISHRA (<i>Alternate</i>)
CSIR - Central Mechanical Engineering Research Institute, Durgapur	DR SUDIP SAMANTHA
CSIR - National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram	DR TPD RAJAN DR M. RAVI (<i>Alternate</i>)
Directorate General of Quality Assurance, Ichhapur	SHRI ASHOK KUMAR SHRI S. ROY CHOWDHURY (<i>Alternate</i>)
Disa India Ltd, Bangalore	SHRI SUNIL KUMAR GHOSH SHRI SURESH KUMAR A (<i>Alternate</i>)
Forace Polymers Private Limited, Haridwar	SHRI D. K. GHOSH
Hindustan Aeronautics, Foundry and Forge Division, Bengaluru	SHRI K. SATYENDRA KUMAR
Indian Institute of Technology, Kharagpur	PROF SARAT PANIGRAHI PROF RAHUL MITRA (<i>Alternate</i>)
Indian Ordnance Factory Board, Kolkata	SHRI G. JHA SHRI A. K. LALA (<i>Alternate</i>)
Indian Ordnance Factory, Grey Iron Foundry, Jabalpur	SHRI M. P. YADAV SHRI ARUNANSHU PRAMANIK (<i>Alternate</i>)
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Ministry of Railway, RDSO, Lucknow	SHRI C. SENGUPTA SHRI RAJ KISHORE PRASAD (<i>Alternate</i>)
Ministry of Science & Technology, New Delhi	MS TAMANNA ARORA SHRI K. S. P. RAO (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
National Institute of Foundry & Forging Technology, Ranchi	DR KAMLESH KUMAR SINGH DR AMITESH KUMAR (<i>Alternate</i>)
National Metallurgical Laboratory, Jamshedpur	DR D. N. PASWAN MS MINAL SHAH (<i>Alternate</i>)
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Steel Cast Ltd, Bhavnagar	SHRI V. K. MODI SHRI B. C. ROUTRAY (<i>Alternate</i>)
Tata Motors, Jamshedpur	SHRI S. KUMAR DR D. S. PADAN (<i>Alternate</i>)
The Institute of Indian Foundry Men, New Delhi	SHRI DINESH GUPTA SHRI SANJEEV KUMAR (<i>Alternate</i>)
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Member Secretary
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This Indian Standard has been developed from Doc No.: MTD 14 (20993).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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